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PATENT

IN THE CLAIMS:

This listing of the claims will replace all prior versions, and listings, of claims in the application:

1-32. (cancelled)

33. (currently amended) A cutter for producing substrate fibers comprising: a leading edge and a trailing edge, said leading edge initially contacting ~~the~~ a substrate during a cutting stroke, said trailing edge being raised a prescribed height above said leading edge; a blade section disposed on a cutting surface of said cutter for cutting the substrate; and at least one substrate fiber channel located proximate said blade section ~~for directing substrate fibers away from the substrate~~, wherein said substrate remains fixed and said cutter moves relative to said substrate during the cutting stroke to produce a plurality of substrate fibers, and wherein said plurality of substrate fibers are directed away from said substrate by said substrate fiber channel.

34. (original) The cutter of claim 33, wherein said blade section is elevated to a height defining a cutting thickness for said substrate fibers.

35. (original) The cutter of claim 33, wherein said prescribed height is equal to the elevated height of said blade section.

36. (original) The cutter of claim 33, wherein said blade section includes at least one row of teeth.

37. (original) The cutter of claim 36, wherein each tooth includes at least one predetermined cutting angle.

38. (original) The cutter of claim 37, wherein each tooth includes a primary cutting angle and a secondary cutting angle.

39. (original) The cutter of claim 38, wherein said primary cutting angle is between 3°-6°.

40. (original) The cutter of claim 38, wherein said primary cutting angle is approximately 4°.

41. (original) The cutter of claim 38, wherein said secondary cutting angle is between 10°-18°.

42. (original) The cutter of claim 38, wherein said secondary cutting angle is between 12°-16°.

43. (original) The cutter of claim 38, wherein said secondary cutting angle is approximately 14°.

44. (currently amended) The cutter of claim 36 ~~33~~, wherein said substrate fiber channel ~~comprises a substrate fiber channel~~ is located proximate ~~a corresponding one of each~~ said at least one row of teeth.

45. (original) The cutter of claim 33, wherein said substrate fiber channel has predetermined dimensions to promote cutting of substrate fibers having desired features.

46. (original) The cutter of claim 33, wherein the substrate is bone.

47. (currently amended) A substrate cutting device comprising:

a base having ~~comprising:~~ a cutter mounted thereon, ~~said cutter being movable along a predetermined cutting path,~~ and a substrate chute extending through said base to position ~~the~~ a substrate in contact with said cutter; and

a tower coupled to said base, wherein said tower comprises ~~and comprising:~~ (a) a lower surface containing a recess therethrough, said recess being in alignment with said substrate chute, and (b) a clamping mechanism for keeping the substrate in contact with said cutter,

wherein said substrate remains fixed and said cutter moves relative to said substrate during a cutting stroke.

48. (original) The substrate cutting device of claim 47, further comprising a substrate fiber

receptacle positioned beneath said cutter to receive substrate fibers cut from the substrate.

49. (original) The substrate cutting device of claim 47, further comprising a plurality of grooves formed along a contact surface of said clamping mechanism for reducing movement of the substrate while in contact with said cutter.

50. (original) The substrate cutting device of claim 47, further comprising a computer controller for controlling operation thereof.

51. (original) The substrate cutting device of claim 47, further comprising a sensor arrangement for detecting prescribed conditions during operation of said substrate cutting device.

52. (original) The substrate cutting device of claim 47, wherein said base further comprises a slide mechanism for receiving said cutter, and wherein said slide mechanism moves said cutter along said predetermined cutting path.

53. (original) The substrate cutting device of claim 52, wherein said cutter is rotated a predetermined amount relative to the cutting path to engage the substrate.

54. (original) The substrate cutting device of claim 52, further comprising a first actuation unit for moving said slide mechanism.

55. (original) The substrate cutting device of claim 54, further comprising a computer controller for controlling operation of said first actuation unit.

56. (original) The substrate cutting device of claim 55, wherein said computer controller variably controls the speed of said slide mechanism and a force applied to cut the substrate.

57. (original) The substrate cutting device of claim 54, wherein said first actuation unit applies a force of 600 lbs-900 lbs during said predetermined cutting stroke.

58. (original) The substrate cutting device of claim 54, wherein said first actuation unit applies a force of 700 lbs-800 lbs during said predetermined cutting stroke.

59. (original) The substrate cutting device of claim 54, wherein said first actuation unit applies a force of 750 lbs during said predetermined cutting stroke.

60. (original) The substrate cutting device of claim 54, wherein said first actuation unit is pneumatically operated at a predetermined constant pressure.

61. (original) The substrate cutting device of claim 54, wherein said first actuation unit is pneumatically operated at predetermined variable pressures.

62. (original) The substrate cutting device of claim 54, wherein said first actuation unit is hydraulically operated.

63. (original) The substrate cutting device of claim 54, wherein said first actuation unit is electrically operated.

64. (currently amended) The substrate cutting device of claim 47, wherein said cutter ~~further~~ comprises[:] a leading edge and a trailing edge, said leading edge initially contacting the substrate during a cutting stroke, said trailing edge being raised a prescribed height above said leading edge; a blade section disposed on a cutting surface of said cutter for cutting the substrate; and at least one substrate fiber channel located proximate said blade section for directing substrate fibers away from the substrate.

65. (original) The substrate cutting device of claim 64, wherein said blade section is elevated to a cutting height defining a thickness for said substrate fibers.

66. (currently amended) The substrate cutting device of claim 65, wherein said ~~prescribed height~~

thickness is equal to the ~~elevated~~ cutting height of said blade section.

67. (original) The substrate cutting device of claim 64, wherein said blade section includes at least one row of teeth.

68. (original) The substrate cutting device of claim 67, wherein each tooth includes at least one predetermined cutting angle.

69. (original) The substrate cutting device of claim 67, wherein each tooth includes a primary cutting angle and a secondary cutting angle.

70. (original) The substrate cutting device of claim 69, wherein said primary cutting angle is between 3°-6 °.

71. (original) The substrate cutting device of claim 69, wherein said primary cutting angle is approximately 4°.

72. (original) The substrate cutting device of claim 69, wherein said secondary cutting angle is between 10°-18°.

73. (original) The substrate cutting device of claim 69, wherein said secondary cutting angle is between 12°-16°.

74. (original) The substrate cutting device of claim 69, wherein said secondary cutting angle is approximately 14°.

75. (currently amended) The substrate cutting device of claim 67, wherein said substrate fiber channel ~~comprises a substrate fiber channel~~ is located proximate ~~a corresponding one of each~~ said at least one row of teeth.

76. (original) The substrate cutting device of claim 64, wherein the trailing edge of said cutter is substantially flush with an upper surface of said slide mechanism.

77. (original) The substrate cutting device of claim 64, wherein said blade section engages the substrate such that the substrate fibers are cut substantially along a grain direction of the substrate.

78. (original) The substrate cutting device of claim 47, wherein said tower further comprises a second actuation unit for operating said clamping mechanism.

79. (original) The substrate cutting device of claim 78, wherein said second actuation unit applies a force of 150 lbs-250 lbs onto the substrate.

80. (original) The substrate cutting device of claim 78, wherein said second actuation unit applies a force of 200 lbs onto the substrate.

81. (original) The substrate cutting device of claim 78, wherein said second actuation unit is pneumatically operated at a predetermined constant pressure.

82. (original) The substrate cutting device of claim 78, wherein said second actuation unit is pneumatically operated at predetermined variable pressures.

83. (original) The substrate cutting device of claim 78, wherein said second actuation unit is hydraulically operated.

84. (original) The substrate cutting device of claim 78, wherein said second actuation unit is electrically operated.

85. (original) The substrate cutting device of claim 78, further comprising a computer controller for controlling operation of said second actuation unit.

86. (original) The substrate cutting device of claim 85, wherein said computer controller variably controls a force applied by said clamping mechanism.

87-93. (cancelled)

94. (new) A substrate cutting device comprising:

a base;

a cutter mounted on said base, said cutter being movable along a predetermined cutting path;

a substrate chute extending through said base to position the substrate in contact with said cutter;

a tower coupled to said base having a lower surface containing a recess therethrough, said recess being in alignment with said substrate chute;

a clamping mechanism for keeping the substrate in contact with said cutter; and

a computer controller for controlling operation of said device.

95. (new) A substrate cutting device comprising:

a base;

a cutter mounted on said base, said cutter being movable along a predetermined cutting path;

a substrate chute extending through said base to position the substrate in contact with said cutter;

a tower coupled to said base having a lower surface containing a recess therethrough, said recess being in alignment with said substrate chute;

a clamping mechanism for keeping the substrate in contact with said cutter; and

a sensor arrangement for detecting prescribed conditions during operation of said substrate cutting device.

96. (new) A substrate cutting device comprising:

a base;

a cutter mounted on said base, said cutter being movable along a predetermined cutting path, wherein said base comprises a slide mechanism for receiving said cutter, and wherein said slide mechanism moves said cutter along said predetermined cutting path;

a substrate chute extending through said base to position the substrate in contact with said cutter;

a tower coupled to said base having a lower surface containing a recess therethrough, said recess being in alignment with said substrate chute; and

a clamping mechanism for keeping the substrate in contact with said cutter.

97. (new) A substrate cutting device comprising:

a base;

a cutter mounted on said base, said cutter being movable along a predetermined cutting path;

a substrate chute extending through said base to position the substrate in contact with said cutter;

a tower coupled to said base having a lower surface containing a recess therethrough, said recess being in alignment with said substrate chute; and

a clamping mechanism for keeping the substrate in contact with said cutter, wherein said tower further comprises a second actuation unit for operating said clamping mechanism.

98. (new) A bone fiber cutting device for producing bone fiber that has a textured surface, a lengthwise grain, and a plurality of parallel striations along the grain, comprising,

a cutter comprising a blade section;

a clamping mechanism for holding a bone tissue having a lengthwise grain;

a slide mechanism that is coupled to the cutter;

wherein the clamping mechanism is disposed relative to the slide mechanism so that the slide mechanism slides substantially parallel to the lengthwise grain of the clamped bone tissue and the blade section contacts the bone tissue during operation of the cutting device;

a first actuation unit that moves the slide mechanism during operation of the cutting

device;

a second actuation unit that positions the clamping mechanism;

at least one fiber channel; and

a controller, wherein the controller controls the first actuation unit and the second actuation unit.

99. (new) The bone fiber cutting device of claim 98, wherein the blade section includes at least one row of teeth.

100. (new) The bone fiber cutting device of claim 98, further comprising a sensor for detecting prescribed conditions during operation of the cutting device.

101. (new) The bone fiber cutting device of claim 98, wherein the controller varies a speed at which the slide mechanism slides during operation of the cutting device.

102. (new) The bone filler cutting device of claim 98, wherein the controller varies a force at which the blade section contacts the bone tissue during operation of the cutting device.

103. (new) The bone fiber cutting device of claim 98, wherein the first actuation unit is pneumatic.

104. (new) The bone fiber cutting device of claim 98, wherein the first actuation unit is hydraulic.

105. (new) The bone fiber cutting device of claim 98, wherein the first actuation unit is electric.

106. (new) The bone fiber cutting device of claim 98, wherein the second actuation unit applies a force of 150 lbs-250 lbs to the clamping mechanism during operation of the cutting device.

107. (new) The bone fiber cutting device of claim 98, wherein the second actuation unit applies

a force of 200 lbs to the clamping mechanism during operation of the cutting device.

108. (new) The bone fiber cutting device of claim 98, wherein the second actuation unit is pneumatic.

109. (new) The bone fiber cutting device of claim 98, wherein the second actuation unit is hydraulic.

110. (new) The bone fiber cutting device of claim 98, wherein the second actuation unit is electric.